**Homework 2**

**Due: March 2nd**

1. **You test the water for your local brewing region and the report comes back:**

**Water Report:**

Ca+2 – Calcium – 5 ppm

Mg+2 – Magnesium – 40 ppm

Alkalinity (in terms of CaCO­3) – 100 ppm

* 1. Calculate the hardness in terms of ppm of:
     1. CaCO­3
     2. HCO3-1
  2. Calculate the pH of the mash if you used this water. Comment on it.

1. **You want to get the pH down to 5.4 using an ion or combination of ions. You may use any single type/combination. Show all work, assumptions, and use values from notes.**
   1. List the PPM concentrations of the ion’s you chose to use.
   2. List the generic name and of the salts you would find those ion’s in.
   3. Are the resulting ion concentrations you used within tolerable levels? If not, recalculate.
2. **If you wanted to get the pH of the mash down to 5.4 using acidulated malt (pH = 3.5):**
   1. What percentage of the grain bill would need to be replaced with acidulated malt? Assume you started with 100% 2-row.
3. **A recipe calls for a specific gravity of 1.060 (@ 60 F), pre fermentation. You have 150 barrels of wort with a specific gravity of 1.070.** 
   1. How many more barrels of water would you need to add to get the gravity to 1.060?